

CAUSES OF BLINDNESS IN YOUTH

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St. Louis

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AMERICAN FOUNDATION
FOR THE BLIND INC.

CAUSES OF BLINDNESS IN YOUTH

AS DETERMINED AT THE MISSOURI SCHOOL FOR THE BLIND

H. D. LAMB, M.D.

ST. LOUIS

There are very few statistics of the causes of blindness; particularly is this true in the case of the young. Dr. H. Frese¹ published a report of the causes of blindness in 849 youthful blind persons, students in the Federal Institute for the Blind at Steglitz.

At the Missouri School for the Blind at St. Louis 507 pupils have taken instruction since 1905. Opportunity thus was offered of determining the ocular condition of a fairly large number of blind children from 5 to 25 years of age. In this number there are included 26 pupils who entered the school at ages greater than 25 years. Of this 26 there are but 9 who became blind when over 25 years of age; none of the 9 lost their sight when older than 31 years.

There are quite a few cases where there is a different cause for blindness in each of the eyes in the same individual. That makes it necessary, if fractions are to be avoided, to tabulate numbers in tables 1 and 3 in terms of eyes, rather than as so many individuals.

TABLE 1. CAUSES OF BLINDNESS

	Number of Eyes			Per cent.
	Boys	Girls	Total	
Ophthalmia neonatorum	80	136	216	21.2
Optic atrophy	94	60	154	15.1
Congenital cataract	54	33	87	8.6
Corneal ulceration	39	29	68	6.7
Uveitis	42	26	68	6.7
Trauma, simple	57	9	66	6.5
Trauma and sympathetic ophthalmia	38	18	56	5.5
Trachoma	25	38	63	6.2
Hydrophthalmus	40	16	56	5.5
Microphthalmus	16	15	31	3.1
Retinal degeneration	18	12	30	3.0
Chorioretinitis	9	13	22	2.2
Prenatal corneal opacity	7	9	16	1.6
Parenchymatous keratitis	6	8	14	1.4
Retinitis pigmentosa	12	2	14	1.4
Postocular amblyopia	2	6	8	.8
Keratoconus	4	2	6	.6
Anophthalmus	6	0	6	.6
Retinal detachment	5	0	5	.5
Prenatal uveitis	2	2	4	.4
Prenatal dislocation of lenses	2	2	4	.4
Myopia		4	4	.4
Aniridia		2	2	.2
Coloboma of iris		2	2	.2
Neuroretinitis	2		2	.2
Essential phthisis of conjunctiva	2		2	.2
Phlyctenular keratitis		2	2	.2
Cataract	2		2	.2
Unknown (cataract obscured fundus)	4		4	.4
Eyes	568	446	1014	100.0
Pupils	284	223	507	
	56.0%	44.0%		

TABLE 2.—NUMBER OF NEW PUPILS FOR EACH SCHOOL YEAR FOR EACH CAUSE OF BLINDNESS

	1905-1906	'06-'07	'07-'08	'08-'09	'09-'10	'10-'11	'11-'12	'12-'13	'13-'14	'14-'15	'15-'16	'16-'17	'17-'18	'18-'19	'19-'20	'20-'21	'21-'22	'22-'23	'23-'24	'24-'25
Total new pupils each year	23	16	30	20	20	20	21	35	11	29	24	27	25	17	16	20	35	36	23	20
Total new pupils, 5 years			109					116					109				134			
Ophthalmia neonatorum	6	5	6	4	3	4	4	8	3	6	5	6	5	4	2	2	4	6	3	2
Percent ophthalmia neonatorum	26%	31%	20%	20%	15%	20%	19%	23%	27%	21%	21%	22%	20%	24%	13%	10%	11%	17%	13%	10%
No. and percent ophth. neon., 5 years		24	-	22%			25	-	22%			22	-	20%			17	-	13%	
Optic atrophy	1	2	6	5	4	6	2	4	3	2	1	5	4	5	3	1	6	6	2	4
Percent optic atrophy	4%	13%	20%	25%	20%	30%	10%	11%	27%	7%	4%	18%	16%	29%	18%	5%	17%	17%	9%	20%
No. and percent optic atrophy, 5 years		18	-	17%			17	-	16%			18	-	17%			19	-	17%	
Congenital cataract	1	3		2		2	2	4	1	4	4	2	2	1	2	2	4	1	4	1
Percent congenital cataract	4%	18%		10%		10%	10%	11%	9%	14%	17%	7%	8%	6%	13%	10%	11%	3%	17%	5%
No. and percent congenital cataract, 5 years		6	-	6%			13	-	11%			11	-	10%			12	-	9%	
Corneal ulceration	1		3	3	1	1		2	2	1	1	2	1		1	1	1			1
Percent corneal ulceration	4%		10%	15%	5%	5%		6%	2%	4%	4%	7%	4%		6%	5%	3%			5%
No. and percent corneal ulceration, 5 years		8	-	7%			6	-	5%			5	-	5%			3	-	2%	
Uveitis	1		2	1	1	1	2	3	1	1				2	1	1	2	4	4	2
Percent uveitis		6%	7%	5%	5%	5%	10%	8%	9%	4%				8%	6%	5%	6%	11%	17%	10%
No. and percent uveitis, 5 years		5	-	5%			6	-	5%			4	-	4%			13	-	10%	
Traumata	2			1	4	4	3	3	1	5	4	2	4	2			4	4	5	1
Percent traumata	9%			5%	20%	20%	14%	8%	9%	17%	17%	7%	4%	12%		20%	11%	11%	13%	5%
No. and percent traumata, 5 years		7	-	6%			14	-	12%			9	-	8%			18	-	13%	
Trachoma		5	2		2	2	3	3		1	1	1	1	1	1		3	3		
Percent trachoma		31%	7%		10%	10%	14%	9%		4%	4%	4%	4%	6%			9%	8%		
No. and percent trachoma, 5 years		9	-	8%			9	-	8%			5	-	5%			6	-	5%	
Hydrophthalmus	1	2	2					2			2	2	2			3	2		1	2
Microphthalmus				1	1		1			2	1	1	1			3	1			
Retinal degeneration	1							1				1		3		1		5	1	1
Chorioretinitis	1				1		1					2	2							
Prenatal corneal opacity								1		1				1	1		1	1	1	1
Parenchymatous keratitis			1								1					2	1	1		
Retinitis pigmentosa			1					2				3					1			
Postocular amblyopia								1							1			1	1	
Keratoconus								1									1			
Anophthalmus					1															1
Retinal detachment															1					1
Prenatal uveitis										1								1		
Prenatal dislocation lenses																	1	1		
Myopia					1								1							

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TABLE 3. CAUSES OF ACCIDENTS OR TRAUMATA
NUMBER OF EYES

	Simple Trauma	Trauma and Sympath. Ophthal.	of Industr. cause	Totals
Gunshot	19			19
Knife		14		14
Dynamite	12		12	24
Dynamite cap	10			10
Scissors		6		6
Powder	5			5
Lime	4			4
Nail		4		4
Fireworks	4			4
Steel		4	2	6
Rock	1	2		3
Coal		2		2
Glass		2		2
Fork		2		2
Penpoint		2		2
Lead pencil		2		2
Explosion boiling water in can	2			2
Spout on oil can		2		2
Button on string		2		2
Thorn		2		2
Rusty tin		2		2
Wire from spring-gun		2		2
Blade of corn		2		2
Striking against chair		2		2
Corn stalk		2		2
Limb of tree	2			2
Kindling	1			1
Sheep shears	1			1
Fall on box	1			1
Twig of tree	1			1
Chair rocker	1			1
Toy cannon	1			1
Collision on athletic field	1			1
Eyes	66	56	14	122
Pupils	33	28	7	61
Per cent.	54.1%	45.9%	11.5%	100.0%

In four cases, one eye had been lost from an entirely different injury from that which had blinded the fellow eye.

The apparent discrepancy, appearing in the number under each cause of blindness, that occurs in the next 4 tables as compared with table 1, is caused through those cases (11 in all) in which one eye is blinded from a different cause than the fellow eye. Such cases have been listed in table 2 and the remaining tables,

as belonging to that cause of blindness accountable for the loss of sight in the eye with better vision at the last examination.

In Table 5 the number before the dash is the number of pupils with the cause of blindness at the left, who lost their sight at the age-period above; the number after the dash is the number of pupils with the cause of blindness at the left, who entered the school at the age-period above. The numbers on the two sides of the dash may refer to entirely different individuals.

In Table 7 the number of people in Missouri living in and the number of blind scholars coming from communities of four different sizes are noted. The first division, cities over 100,000, would include only St. Louis and Kansas City, where there are many physicians doing eye work exclusively; the second division, cities with a population between 100,000 and 5,000, have physicians specializing in eye, ear, nose and throat work; the third division, towns having 5,000 to 100 individuals, have no specialists but have general physicians, and the last section, localities of 100 and less inhabitants, are served in most instances by no physicians whatever. It must be remembered that conditions in these localities as regards specialists are in many instances now quite different from what they were twenty or thirty years ago when many of the cases listed in our tables lost their sight.

Tables 8 and 9 are simply the writer's estimates from the previous tables of the amount of blindness due to venereal diseases and the amount of preventable blindness. Needless to say such estimates are subject to much difference of opinion.

TABLE 4. AMOUNTS OF VISION

	Totals	NUMBER OF PUPILS WITH VISION				Per cent. with vision 0 & L. P
		OF—	Light Percept.	L. P.— 5-200	5-200— 20-200	
Ophthalmia neonatorum	108	32	29	20	16	56.5
Optic atrophy	77	29	13	21	10	54.6
Congenital cataract	44		2	11	4	8.7
Cornual Ulceration	35	8	16	4	3	68.6
Uveitis	32	19	6	4	2	78.1
Trauma, simple	33	16	5	10	1	63.6
Trauma with sympathetic ophthalmia	28	10	11	5	1	75.0
Trachoma	32	6	4	7	4	31.3
Hydrophthalmus	28	7	7	10	4	50.0
Microphthalmus	14	7	2	1	3	64.3
Retinal degeneration	15	4	2	5	1	40.0
Chorioretinitis	12	2	1	2	4	25.0
Prenatal corneal opacity	8	2	1	3	1	27.5
Parenchymatous keratitis	7		2	2	3	0.0
Retinitis pigmentosa	7		2	2	3	28.6
Postocular amblyopia	4		2		2	50.0
Keratoconus	3			1	2	
Anophthalmus	3	3				
Retinal detachment	3	1	1	1		
Prenatal dislocation of lenses	2			1		
Prenatal uveitis	2	1			1	
Myopia	2	1				
Aniridia	1					
Coloboma of iris	1					
Neuroretinitis	1				1	
Essential phthisis of conjunctiva	1				1	
Phlyctenular keratitis	1				1	
Cataract	1			1		
Unknown (Cataract obscured fundus)	2		2			
Total Pupils	507	149	106	111	80	61
Per cent	100.0%	29.4%	20.9%	21.9%	15.8%	12.0%

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TABLE 5. AGES AT WHICH PUPILS LOST VISION—AGES AT WHICH PUPILS ENTERED SCHOOL

	Totals	Number of pupils losing vision and entering school at respective ages below							
		Age Periods							
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40
<i>Prenatal Conditions (Present before birth)</i>									
Optic atrophy	-23		-11	-8		-3			-1
Congenital cataract	-44		-17	-16	-9	-1			-1
Microphthalmus	-14		-6	-5	-3				
Prenatal corneal opacity	-8		-3	-3	-1			-1	
Postocular amblyopia	-2		-1		-1				
Anophthalmus	-3		-2	-1					
Prenatal uveitis	-2			-1	-1				
Prenatal dislocation of lenses	-2		-1	-1					
Aniridia	-1		-1						
Coloboma of iris	-1		-1						
Subtotals—19.5%	-100		-43	-35	-15	-4		-1	-2
<i>Hereditary Conditions (Occuring after birth)</i>									
Optic atrophy	24-24	2-	10-3	6-8	5-8	1-4		-1	
Hydrophthalmus	28-28	23-	3-4	1-16	1-7		-1		
Retinal degeneration	15-15	11-	3-6	-3	1-4	-1	-1		
Chorioretinitis	12-12	6-	1-2	2-6	2-1	1-3			
Parenchymatous keratitis	7-7	3-	3-1	1-5	-1				
Retinitis pigmentosa	7-7	3-	4-2	-1	-3	-1			
Postocular amblyopia	1-1		1-1						
Keratoconus	3-3	2-		1-2				-1	
Myopia	2-2	1-		-1				1-1	
Cataract	1-1			1-1					
Unknown (cataract obscured fundus)	2-2			2-1	-1				
Subtotals—20.1%	102-102	51-	25-19	14-44	9-25	2-9	-2	1-3	
<i>Acquired Conditions</i>									
Ophthalmia neonatorum	108-108	108-	-60	-30	-11	-6	-1		
Optic atrophy	30-30	5-	12-4	4-9	3-8	1-3	4-4	1-2	
Corneal ulceration	35-35	15-	10-7	7-16	1-6	1-5	1-1		
Uveitis	32-32	14-	8-9	5-12	2-5	2-3	1-2	-1	
Trauma, simple	33-33		12-7	5-3	12-10	3-8	1-2	-1	-2
Trauma and sympathetic ophthalmia	28-28	11-	5-8	7-8	4-9	1-2			-1
Trachoma	32-32	7-	14-5	6-10	5-11	-4	-2		
Retinal detachment	3-3			2-1	-1	1-1			
Neuroretinitis	1-1			1-	-1				
Essential phthisis of conjunctiva	1-1	1-		-1					
Phlyctenular keratitis	1-1	1-	-1						
Postocular amblyopia	1-1	1-		-1					
Subtotals—60.4%	305-305	163-	61-101	37-91	27-62	9-32	7-12	1-4	-3
Totals	507	214-	86-163	51-170	36-102	11-45	7-14	2-8	-5

TABLE 6. WASSERMANN TESTS ON BLOOD—CASES WITH PARENTS RELATED—CASES WITH BLIND RELATIVES

	Totals	Wassermann Blood Pos.	Test Neg.	Totals having Test	No. with Parents Related	No. hav- ing blind Relatives
<i>Prenatal Conditions</i>						
Optic atrophy	23	1	12	13		
Congenital cataract	44		17, 24	25		15
Microphthalmus	14		13	13	3	1
Prenatal corneal opacity	8		7	7		
Postocular amblyopia	2		1	1		
Anophthalmus	3		1	1		
Prenatal uveitis	2		2	2		
Prenatal dislocation of lenses	2		1	1	1	
Aniridia	1		1	1		
Coloboma of iris	1		1	1		1
Subtotal	100		1	1		1
<i>Hereditary Conditions</i>						
Optic atrophy	24	2(2+), 6	5	13		
Hydrophthalmus	28		17, 14	15		2
Retinal degeneration	15		9	9		3
Chorioretinitis	12	3	2	5	2	
Parenchymatous keratitis	7	5	2	7		
Retinitis pigmentosa	7		3	3	1	2
Postocular amblyopia	1		1	1		
Keratoconus	3		1	1		
Myopia	2		1	1		
Cataract	1		1	1		1
Unknown (cataract obscured fundus)	2		1	1		
Subtotal	102		2	2		
<i>Acquired Conditions</i>						
Ophthalmia neonatorum	108		52	52		
Optic atrophy	30	2	6	8		
Corneal ulceration	35		10	10		1
Uveitis	32	2	21	23	2	
Trauma, simple	33		13	13		1
Trauma and sympathetic ophthalmia	28		13	13		
Trachoma	32		11	11		5
Retinal detachment	3					
Neuroretinitis	1					
Essential phthisis of conjunctiva	1		1	1		
Phlyctenular keratitis	1		1	1		
Postocular amblyopia	1		1	1		
Subtotal	305					
Totals	507	2(2+) -19	27-233	256	9	33

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TABLE 7. NUMBER OF PUPILS FROM COMMUNITIES OF DIFFERENT SIZES FOR EACH CAUSE OF BLINDNESS

	Cities over 100,000	Cities 100,000 to 5000	Towns 5000 to 100	100 and less	Totals
Total populat. each community (1920).....	1,097,307	379,155	658,739	1,268,854	3,404,055
Ophthalmia neonatorum	3? 32	20	44	9	108
Optic atrophy	2? 28	16	25	6	77
Congenital cataract	2? 14	5	18	5	44
Corneal ulceration	5? 5	2	17	6	35
Uveitis	2? 10	4	12	4	32
Trauma, simple	3? 4	6	16	4	33
Trauma and sympathetic ophthalmia	2? 5	2	11	8	28
Trachoma	2? 4	3	20	3	32
Hydrophthalmus	2? 7	6	11	2	28
Microphthalmus		1	8	5	14
Retinal degeneration	3? 3	2	6	1	15
Prenatal corneal opacity	1? 2		5		8
Chorioretinitis		4	1	7	12
Parenchymatous keratitis		2	1	4	7
Retinitis pigmentosa	1		5	1	7
Postocular amblyopia		1	3		4
Keratoconus			3		3
Anophthalmus		1	1	1	3
Retinal detachment	1	1	1	1	3
Prenatal uveitis		1	1		2
Prenatal dislocation of lenses	1		1		2
Myopia		1	1		2
Aniridia			1		1
Coloboma of iris			1		1
Neuroretinitis	1				1
Essential phthisis of conjunctiva.....	1				1
Phlyctenular keratitis				1	1
Cataract	1				1
Unknown (Cataract obscured fundus)			2		2
Totals	127	73	223	57	507
To each 100,000 of population.....	12	19	34	5	15

TABLE 8. ESTIMATE OF BLINDNESS DUE TO VENEREAL DISEASE

	Totals	Number of Pupils Per cent. due to V. Disease	Number due to V. Disease
Ophthalmia neonatorum	108	85%	92
Optic atrophy	77	75%	58
Uveitis	32	15%	5
Microphthalmus	14	20%	3
Chorioretinitis	12	75%	9
Paronychmatous keratitis	7	100%	7
Totals			174
Percentage of 507			34%

Uveitis	32	15%	5
Trauma, simple	33	100%	33
Trauma with sympathetic ophthalmia	28	100%	28
Trachoma	32	100%	32
Microphthalmus	14	20%	3
Chorioretinitis	12	75%	9
Paronychmatous keratitis	7	100%	7
Phlyctenular keratitis	1	100%	1
Total			343
Percentage of 507.....			68%

TABLE 9. ESTIMATE OF PREVENTABLE BLINDNESS

	Totals	Number of Pupils Per cent. Prevent.	Number Prevent.
Ophthalmia neonatorum	108	100%	108
Optic atrophy	77	75%	58
Congenital cataract	44	75%	33
Corneal ulceration	35	75%	26

Conclusions. If statistical tables are clearly set forth, as it is earnestly hoped the above are, the reader can easily and accurately draw his own conclusions. I have purposely refrained from including extended explanations and deductions. Figures speak for themselves.

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